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NAS BRUNSWICK
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Final

1995 Annual Report
Monitoring Events 1 through 4
Building 95, Naval Air Station, Brunswick, Maine

Contract No. N62472-92-D-1296
Contract Task Order No. 0047

Prepared for

Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway
Mail Stop No. 82
Lester, Pennsylvania 19113-2090

Prepared by

EA Engineering, Science, and Technology
The Maple Building
3 Washington Center
Newburgh, New York 12550

July 1996
296.0047

29600.47

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Michael S. Battle, P.G.
CTO Manager

30 July 1996
Date

Charles W. Houlik, Jr., Ph.D., CPG
Program Manager

30 July 96
Date

July 1996

QUALITY REVIEW STATEMENT

Contract No. N62472-92-D-1296 EA Project Number: 296.0047
Contract Task Order No. 0047
Activity NAS Brunswick; Long Term Monitoring

Description of Report/Deliverable:

Final 1995 Annual Report, Monitoring Events 1 through 4, Building 95, Naval Air Station, Brunswick, Maine

EA Project Manager: Michael S. Battle, P.G.

In compliance with EA's Policy and Procedures for review of deliverables, this final deliverable has been reviewed for quality by the undersigned Senior Technical Reviewer(s). The information presented in this report/deliverable has been prepared in accordance with the approved scope of services for the project and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the contract and/or the standard of care existing at the time of preparation.

Senior Technical Reviewer(s)

Gloria D. McCleary, P.E. 2/29/96
Vice President Date

[Name] Date
Title

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1. INTRODUCTION

1.1 BACKGROUND

Under Contract No. N62472-92-D-1296, Contract Task Order (CTO) No. 0047, Northern Division, Naval Facilities Engineering Command contracted with EA Engineering, Science, and Technology to perform long-term monitoring at Building 95 at Naval Air Station (NAS), Brunswick, Maine. NAS Brunswick is located south of the Androscoggin River between Brunswick and Bath, Maine (Figure 1-1). Figure 1-2 provides the layout for the Building 95 site.

NAS Brunswick is an active base owned and operated by the federal government through the Department of the Navy. In 1987, NAS Brunswick was placed on the National Priorities List by the U.S. Environmental Protection Agency (EPA) and is currently participating in the Navy's Installation Restoration Program. At the Building 95 site, the Navy is required to perform long-term monitoring, maintenance, and corrective measures as part of the long-term remedial actions required by the Action Memorandum dated April 1993 (ABB-ES 1993). A Long-Term Monitoring Plan (LTMP) was established pursuant to these Records of Decision (ABB-ES 1994a). Approval of the LTMP was received from EPA and State of Maine Department of Environmental Protection on 23 June 1994.

1.2 LONG-TERM MONITORING PROGRAM

The LTMP document is comprised of a Long-Term Monitoring Program, Quality Assurance Project Plan, Safety and Health Plan, and remedial construction technical specifications. The LTMP establishes the requirement for monitoring/sampling to be conducted on a quarterly basis for 5 years (ABB-ES 1994a). Implementation of the LTMP will enable the Navy to collect data in order to conduct a 5-year review, which is a required analysis of newly promulgated or modified federal and state regulations to determine if they are applicable or relevant and appropriate requirements and to determine if they challenge the protectiveness of the implemented remedial strategy. Although sampling is planned for a 30-year period, review evaluations will provide a basis for continued sampling and proposing refinements/alterations to the monitoring program or remedial activity, if appropriate. The review evaluations will occur a minimum of once every 5 years. A summary of the Long-Term Monitoring Program for ground water at Building 95 is provided in Table 1-1.

The objective of the Long-Term Monitoring Program is to obtain data necessary to monitor the long-term effectiveness of the remedial actions conducted at Building 95. Monitoring, sampling, and inspection data collected during the performance of long-term monitoring are being used to:

- Assess ground-water quality following the completion of the removal action.

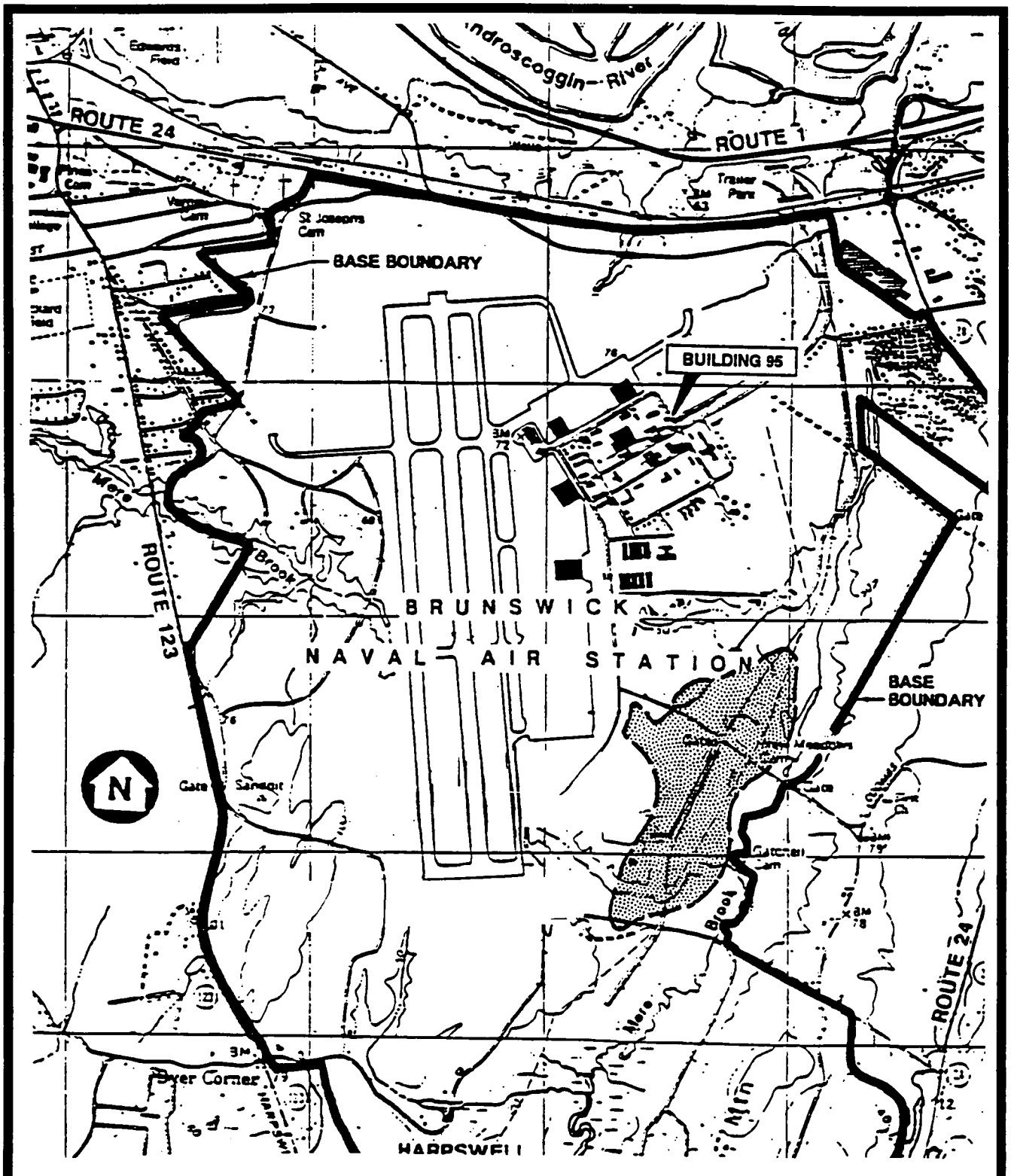
- Evaluate the long-term effectiveness of the soil and debris removal action by comparing ground-water chemical quality upgradient and downgradient of the site.

- Ensure the integrity of the liner system installed in the excavation is not compromised by exposure at the land surface or penetration by vegetation and/or animals.

- Assess the potential for adverse ecological impacts by monitoring for evidence of stressed vegetation.

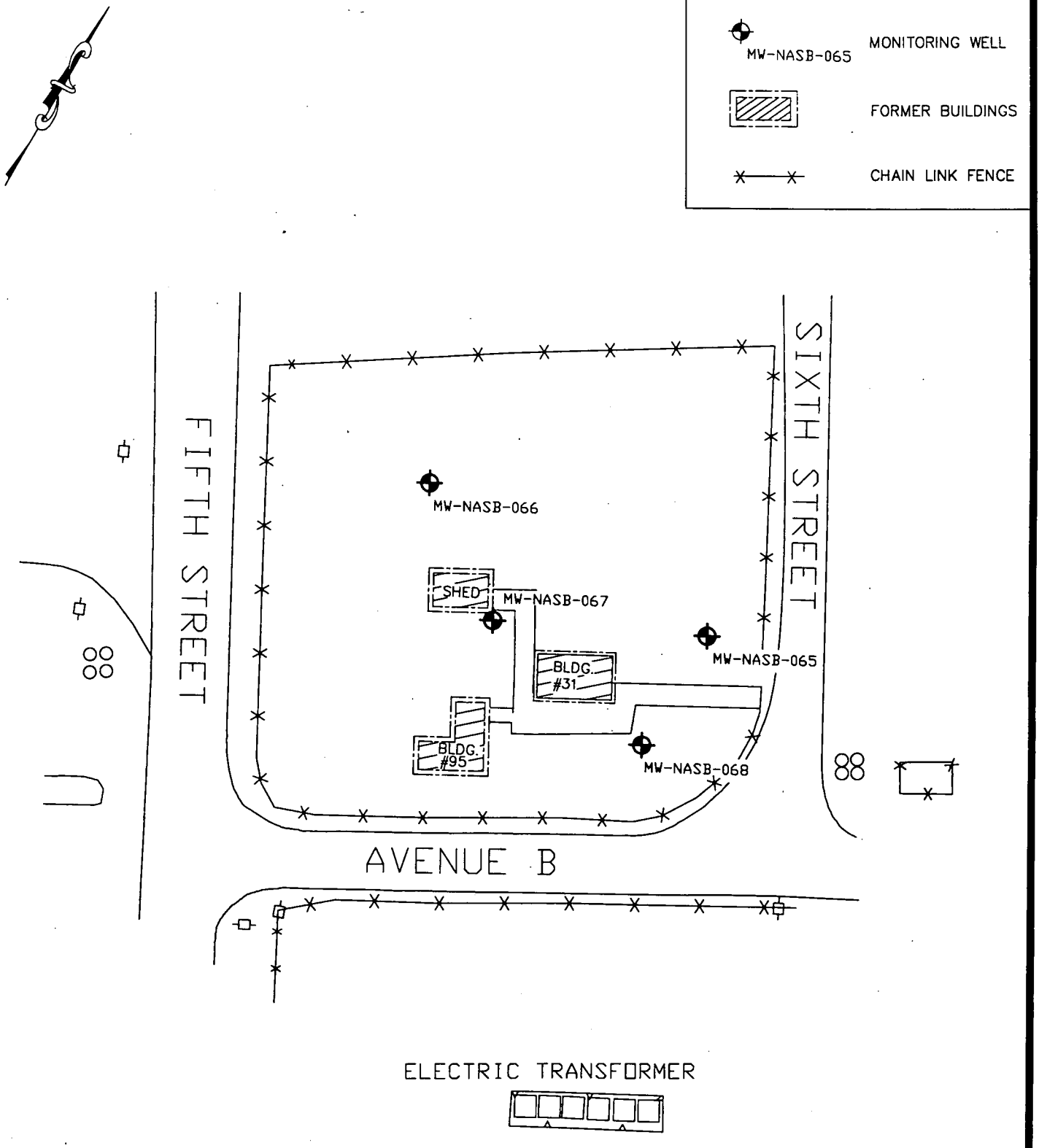
1.3 ANNUAL REPORT ORGANIZATION

This annual report details the project activities conducted as part of the Long-Term Monitoring Program at the Building 95 site. Chapter 1 provides an introduction and overview of the Long-Term Monitoring Program activities at the site. Chapter 2 presents site background information and a description of the geology and hydrogeology of the site. Chapter 3 discusses the results of the four monitoring events during 1995. Chapter 4 summarizes the results of the 1995 monitoring events and presents conclusions and recommendations based on these results.



Source: USGS 7.5-minute series topographic maps: Brunswick, Maine, Quadrangles (1980); and Orrs Island, Maine, 1978. Scale 1:24,000.

Figure 1-1. Site location map for Building 95, Naval Air Station, Brunswick, Maine.



NOTE: SITE PLAN TAKEN FROM THE INTEGRAPH VERSION 5 BASE-WIDE PLAN PROVIDED BY NAS BRUNSWICK PUBLIC WORKS DEPARTMENT ON 13 OCTOBER 1995.

DWG. FILE No. F:\CAD\29600\47\BLD-95-2

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

BUILDING 95
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 1-2
SITE PLAN

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB		SY	MSB	AS SHOWN	13 DEC 95	29600.47	BLD95EV4

TABLE 1-1 SUMMARY OF LONG-TERM MONITORING PROGRAM AT BUILDING 95, NAVAL AIR STATION, BRUNSWICK, MAINE

Sample Location	Sampling Frequency	Sample Parameters					
		TCL VOC	TCL SVOC	TCL Pesticides	Rotenone/ Pyrethrins	TAL Elements	Field Parameters[a]
Monitoring Wells							
MW-NASB-065	Quarterly	X	X	X	X	X	X
MW-NASB-066	Quarterly	X	X	X	X	X	X
MW-NASB-067	Quarterly	X	X	X	X	X	X
MW-NASB-068	Quarterly	X	X	X	X	X	X

(a) Determination of field parameters in accordance with EPA/600/4-79/020 using the following methods: pH (Method 150.1), temperature (Method 170.1), specific conductance (Method 180.1), and dissolved oxygen (Method 360.1). Includes water level measurement.

NOTE: SVOC = Semivolatile organic compounds; TAL = Target Analyte List; TCL = Target Compound List; VOC = Volatile organic compounds (EPA SW-846).

2. SITE BACKGROUND

2.1 SITE DESCRIPTION

Building 95 was the pesticide/herbicide storage area and distribution center for NAS Brunswick until 1985. Previous investigations identified the presence of several herbicides and pesticides, including 4,4'-dichlorodiphenyltrichloroethene (4,4'-DDE) and pyrethrins in the soil and on structures at the site. Additionally, low concentrations of pesticides and inorganics were reported in ground-water samples.

Corrective measures were taken at the site following completion of a baseline risk assessment. Remedial measures included the removal of impacted soil and debris, placement of a geotextile liner at the bottom of the excavation, and backfill with clean fill. As part of the LTMP, monitoring at the 4 existing monitoring wells is conducted quarterly to establish whether any residual soil impact remains after the removal action is affecting ground-water quality.

2.2 GEOLOGY/HYDROGEOLOGY

The overburden geology in the vicinity of Building 95 site consists of well sorted sand and silty clay units. Generally, the glacio-marine clay underlies the sand unit and has been reported to be approximately 8 ft thick. The depth to bedrock at the site has not been determined. As part of remediation activities conducted at the site, the upper portion of the area of concern at the site was excavated, a geotextile liner was emplaced, and the excavation backfilled with clean fill. Excavation activities resulted in the removal of 1-4 ft of soil from the surface of the site. Four wells (MW-NASB-065, MW-NASB-066, MW-NASB-067, and MW-NASB-068) were installed at the site in 1993 to monitor ground-water quality as part of the Long-Term Monitoring Program. The total depths of site monitoring wells range from 15 to 20 ft below surface grade. The static overburden water table is generally present at 3-5 ft below surface grade. Ground-water flow is generally toward the east-southeast.

Background inorganic concentrations in ground water collected during previous investigations at NAS Brunswick are summarized in Table 2-1. Results of the background ground-water sampling indicate that the highest detected concentrations of five inorganics (aluminum, iron, magnesium, manganese, and thallium) have been reported at concentrations above corresponding State Maximum Exposure Guidelines (MEGs) and/or Federal Maximum Contaminant Levels (MCLs) for these analytes (ABB 1994b).

TABLE 2-1 SUMMARY OF BACKGROUND CONCENTRATIONS OF INORGANICS IN GROUND WATER FROM PREVIOUS INVESTIGATIONS

Inorganic Parameter	CRDL (μg/L)	Minimum (μg/L)	Maximum (μg/L)	MEG[a] (μg/L)	MCL[b] (μg/L)
Aluminum	200	15	**652**	1,430	50-200[c]
Antimony	60	---	---	2.8	6
Arsenic	10	1.8	2.8	---	50
Barium	200	4.6	17	1,500	2,000
Beryllium	5	---	---	---	4
Cadmium	5	---	---	5	5
Calcium	5,000	1,190	18,000	---	---
Chromium	10	2.4	6.3	100	100
Cobalt	50	4.3	8	---	---
Copper	25	3	4	---	1,300[d]
Iron	100	18	**4,430**	---	300[c]
Lead	3	3.3	10	20	15[d]
Magnesium	5,000	**657**	**8,300**	200	50[c]
Manganese	15	11	**570**	200	50[c]
Mercury	0.2	0.11	0.11	2	2
Nickel	40	---	---	100	100
Potassium	5,000	230	4,800	---	---
Selenium	5	---	---	10	50
Silver	10	---	---	50	100[c]
Sodium	5,000	2,130	52,500	---	---
Thallium	10	**1.4**	**2.1**	0.4	2
Vanadium	50	4	9.2	---	---
Zinc	20	3.8	105	---	5,000[c]
Cyanide	10	---	---	154	200

(a) MEG (Maximum Exposure Guideline) obtained from State of Maine Department of Human Services Revised Maximum Exposure Guidelines, memorandum dated 23 October 1992. Dashes (---) indicate no MEG applicable.
(b) MCL (Maximum Contamination Level) obtained from 40 CFR Parts 141 and 142 (U.S. EPA 1994). Dashes (---) indicate no MCL applicable.
(c) Secondary MCL, based on taste, odor, or color.
(d) Action level.

NOTE: Bold indicates concentration exceeds State MEG or Federal MCL.
CRDL = Contract Required Detection Limit.

MONITORING WELLS USED TO DEFINED BACKGROUND CONSIST OF:

Well and Location	Well and Location
MW-2118, Site 1	MW-702, Site 7
MW-301, Site 11	MW-703, Site 7
MW-312, East of Base Boundary	MW-705, Site 7
MW-320, Site 6	MW-801, Site 8
MW-403, Site 4	

SOURCES: E.C. Jordan Company (1990, 1991); ABB-ES (1994b).

3. LONG-TERM MONITORING PROGRAM—1995

3.1 WATER LEVEL GAUGING PROGRAM

3.1.1 Description of Water Level Gauging Program

Water level measurements were obtained from the 4 ground-water monitoring wells located at the Building 95 site during the four monitoring events. Depth to water measurements were conducted in accordance with procedures specified in the LTMP (ABB-ES 1994a). Water levels were obtained on a single day before ground-water sampling activities were conducted during each monitoring event.

3.1.2 Quality Assurance/Quality Control Procedures

Field equipment used for water level gauging was operated and calibrated in accordance with the Quality Assurance Project Plan contained in the LTMP (ABB-ES 1994a). Water level gauging was conducted using either a QED Environmental Systems, Inc. Model 6000 or a Slope Indicator Model 51453 water level indicator, capable of measuring depth to water to an accuracy of 0.01 ft. Well gauging was completed by lowering the sensing probe down the well and measuring the depth to water from the notch/indelible marking on the top of the well riser.

3.1.3 Results of Water Level Gauging Program

Water level data were collected during each of the four monitoring events to assess ground-water flow direction and hydraulic gradient at the Building 95 site. Table 3-1 provides a summary of the water table elevations for Monitoring Events 1 through 4. The completed Field Record of Well Gauging forms are provided in the quarterly reports for the March 1995 (EA 1995a), May 1995 (EA 1995b), August 1995 (EA 1995c), and November 1995 (EA 1996) monitoring/sampling events.

Interpretive water table elevation maps were developed from the data collected from the four monitoring events. Figures 3-1 through 3-4 provide the interpreted water table elevations for the 31 March 1995, 1 May 1995, 2 August 1995, and 14 November 1995 well gauging events, respectively. Ground-water contour maps indicate the predominant ground-water flow direction at the site is toward the east-southeast, although a more easterly flow direction was noted during the March 1995 monitoring event. The average hydraulic gradient, based on data collected from the four monitoring events, is 0.012 ft/ft. The highest water elevations and hydraulic gradient (0.017 ft/ft) were recorded during the March 1995 monitoring event, and the lowest water elevations and hydraulic gradient (0.008 ft/ft) were recorded during the August 1995 monitoring event.

Gauging data from 15 March 1995 indicated a potential ground-water mound may be present although this may be the result of precipitation which occurred before gauging. Gauging data obtained later that month prior to sampling (31 March 1995) did not exhibit a similar feature.

3.2 GROUND-WATER MONITORING AND SAMPLING PROGRAM

3.2.1 Description of Ground-Water Monitoring and Sampling Program

Ground-water samples were obtained during each monitoring event from the 4 ground-water monitoring wells located at the Building 95 site. Ground-water samples were collected in accordance with procedures specified in the LTMP (ABB-ES 1994a) using dedicated, low-flow submersible pumps. The low-flow sampling method was used since it minimizes turbidity in ground-water samples. A detailed discussion of the low-flow sampling technique, including dedicated pump system installation, is provided as Appendix A of the March 1995 quarterly monitoring event report (EA 1995a).

Water quality indicator parameters, including pH, conductivity, temperature, and turbidity, were monitored during well purging. Ground-water samples were collected following stabilization of water quality indicator parameters. Stabilization of water quality indicator parameters was achieved when 3 consecutive measurements were within 10 percent agreement of the previous reading, or when turbidity measurements were reduced to below 10 nephelometric turbidity units (NTU).

Ground-water samples were collected for the following analyses: Target Compound List (TCL) volatile organic compounds (VOC) plus a library search of 15 tentatively identified compounds by EPA Method 8260; TCL semivolatile organic compounds (SVOC) plus a library search of 20 tentatively identified compounds by EPA Method 8270; TCL pesticides by EPA Method 8080; total pyrethrins and rotenone by modified EPA Method 8310; and Target Analyte List (TAL) elements, plus cyanide by EPA Method 9010. During the March and May 1995 sampling events, TAL elements were analyzed by atomic adsorption and inductively coupled plasma. Following approval of the use of trace inductively coupled plasma methodologies, TAL metals (excluding mercury) analyses for the August and November 1995 sampling events were performed using trace inductively coupled plasma (EPA Method 6010); mercury continued to be analyzed by cold vapor atomic adsorption (EA Method 7470). Table 1-1 summarizes the analytical program for ground-water samples collected at Building 95. A summary of the analytical results for ground-water samples collected during the four quarterly sampling events is provided in Table 3-2. A summary of the tentatively identified compounds detected in ground water is provided in the monitoring event reports (EA 1995a, 1995b, 1995c, 1996).

3.2.2 Quality Assurance/Quality Control Procedures

Quality assurance/quality control procedures for ground-water sampling were conducted in accordance with the Quality Assurance Project Plan contained in the LTMP (ABB-ES 1994a). To meet the data quality objectives, proper chain-of-custody, sampling handling practices, and documentation were maintained in the field in accordance with the LTMP (ABB-ES 1994a).

A revised sample tracking system was developed following the May 1995 sampling event and utilized during the August and November 1995 sampling events to improve the data quality review process. This process included revisions to the sample identification system, designed to reduce potential for transcription error.

Field quality control was documented though the submission of field quality control samples for analysis, including trip blanks, field duplicates, and matrix spike/matrix spike duplicate samples. During the March 1995 sampling event, equipment rinse blank and source water blank samples were collected to document the cleanliness of the dedicated pumping systems installed in site monitoring wells. The analytical laboratory provided data packages consisting of Level III deliverables (as defined by EPA data quality objectives guidance), including sample analysis data, blank analysis data, duplicate sample results, surrogate recoveries, matrix spike recoveries, and laboratory control sample recoveries. The level of data quality required by the LTMP did not require validation and documentation of EPA Contract Laboratory Program procedures. As required by the LTMP (ABB-ES 1994a), review of laboratory data was performed on selected quality control parameters to evaluate precision, accuracy, and completeness and data quality objective requirements. A complete discussion of the quality assurance/ quality control program, and detailed reviews of analytical quality control for each sampling event, are provided in the quarterly monitoring reports. There were no significant variations in data quality noted during these reviews.

3.2.3 Results of Ground-Water Monitoring and Sampling Program

Site wells were sampled upon reaching equilibrium of water quality indicator parameters during all sampling events with the exception of the August 1995 sampling event. During the August 1995 sampling event, 3 of 4 site wells were purged dry during the sampling process, despite purging at the lowest flow rate obtainable (0.2 gal per minute). During the August 1995 sampling event, wells MW-NASB-067 (14 NTU) and MW-NASB-068 (73 NTU) were the only wells with reported turbidity values above 10 NTU; this threshold was not exceeded during any other sampling event.

A summary of those compounds/analytes detected in ground-water samples collected during Monitoring Events 1 through 4, and those listed as contaminants of concern, are provided in Table 3-2. The analytical results of ground-water samples were compared to the State of Maine Department of Environmental Protection MEGs and Federal MCLs to determine if ground-water quality exceeded applicable regulatory criteria.

3.2.3.1 Volatile Organic Compounds

VOC were reported in ground-water samples collected at each of the 4 wells sampled during the 1995 monitoring events. Ten VOC were reported in ground-water samples including: methylene chloride, acetone, total xylenes, toluene, ethylbenzene, 2-butanone, 1,1,1-trichloroethane, 1,1-dichloroethene, 1,2-dichloroethene, and carbon disulfide. The highest reported VOC concentration (55 μg/L of 2-butanone; State MEG of 170 μg/L; no Federal MCL) was reported in well MW-NASB-065.

Of the 10 reported VOC, only 1 VOC (methylene chloride) was reported at a concentration above the corresponding regulatory criteria (the Federal MCL for methylene chloride is 5 μg/L; no corresponding State MEG). Methylene chloride is a common laboratory contaminant, and the ground-water samples that contained reported concentrations of methylene chloride above the Federal MCL were also associated with a trip blank and associated method blank that also contained this compound.

3.2.3.2 Semivolatile Organic Compounds

SVOC were sporadically reported in the 4 wells sampled during the 1995 monitoring events. Five SVOC were reported in ground-water samples, including: phenol, 4-methyl phenol, bis(2-ethylhexyl)phthalate, diethyl phthalate, and di-n-butyl phthalate. The highest reported individual SVOC concentration (29 μg/L of 4-methylphenol; no corresponding State MEG or Federal MCL) was reported in well MW-NASB-065. No SVOC were reported at concentrations above corresponding State MEGs or Federal MCLs.

3.2.3.3 Inorganics

Inorganics were reported in the 4 wells sampled during the 1995 monitoring events. A total of 18 inorganics were reported in ground-water samples including: aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, zinc, and cyanide. The highest reported concentration of an inorganic (92,200 μg/L of sodium; no corresponding State MEG or Federal MCL) was reported in MW-NASB-066. Of the 18 reported inorganics, concentrations of only one analyte (manganese) were reported at concentrations above the corresponding State MEG during the 1995 quarterly sampling events. Concentrations of manganese were reported above the corresponding State MEG in 3 of 4 monitoring wells at the site during 1995. Background concentrations of manganese have also been reported above the corresponding State MEG as summarized in Table 2-1 (ABB-ES 1994b). Therefore, the presence of this analyte may be the result of natural site conditions.

3.2.3.4 Pesticides

Pesticides were reported in 1 of the 4 wells (MW-NASB-067) sampled during the 1995 quarterly sampling events. Two pesticides (4,4'-DDT and 4,4'-DDD) were reported in ground-water

samples collected from MW-NASB-067. The highest reported pesticide concentration was detected at MW-NASB-067, which reported 0.24 μg/L of 4,4'-DDT (State MEG of 0.83 μg/L; no Federal MCL). There were no other reported detections of pesticides at other monitoring wells. No pesticides were reported at concentrations above the corresponding State MEG or Federal MCL.

3.2.3.5 Total Pyrethrins and Rotenone

During 1995, total pyrethrins and rotenone were reported in 1 of 4 wells (MW-NASB-068). The highest reported concentration of total pyrethrins at MW-NASB-068 was 9.7 μg/L (no corresponding State MEG or Federal MCL). The highest reported concentration of rotenone was 7.3 μg/L (State MEG of 4 μg/L; no Federal MCL). Rotenone was reported at a concentration above the State MEG of 4 μg/L during the March 1995 and May 1995 quarterly sampling events, although non-detections were reported for this compound during the August 1995 and November 1995 monitoring events.

3.2.4 Frequency of Analytical Detections in Ground Water

Frequency of detection is calculated by dividing the total number of detections in samples, including duplicate samples, by the total number of analyses for that analyte. The frequency of detection for each analyte can be used to determine those which are consistently detected in ground-water samples, or those which have been reported infrequently. A detection frequency of 100 percent indicates a compound/analyte is reported in all site wells, including upgradient and downgradient locations. This would be expected for compounds that are common laboratory contaminants, and for naturally occurring analytes that may not be related to past disposal practices at the site. Table 3-3 summarizes the frequency of detections in ground-water samples for each compound/analyte.

Results listed on this table indicate that the majority of VOC are detected with a frequency of 25 percent or less, with the exception of compounds that are common laboratory contaminants, such as methylene chloride and acetone, which have frequencies of detection of 100 percent and 45 percent, respectively. SVOC detections exhibit a similar trend, with all SVOC having a frequency of detection of less than 15 percent, except for the common laboratory contaminant bis(2-ethylhexyl)phthalate, which has a frequency of detection of 55 percent. Only two pesticides, 4,4'-DDD and 4,4'-DDT, had a frequency of detection above zero; these pesticides exhibited frequencies of detection of 15 percent and 20 percent, respectively. Total pyrethrins and rotenone each exhibited a 10 percent frequency of detection. Several inorganics, including aluminum, barium, calcium, iron, magnesium, manganese, potassium, and sodium, had a frequency detection of 100 percent, and are likely present due to natural conditions at the site.

3.3 VISUAL INSPECTION

Site inspection activities were completed during each monitoring event by a civil engineer in accordance with the LTMP (ABB-ES 1994a). Site inspection activities included the following tasks:

- Inspection of the site area for evidence of stressed vegetation.
- Inspection of the site area for potential surface exposure and/or puncture of the geotextile liner system.
- Inspection of the 4 site ground-water monitoring wells.

The results of the site inspection activities indicated no evidence of stressed vegetation in the site vicinity, nor any evidence of animal burrowing in the vicinity of the soil/debris removal area. No significant stressed vegetation was observed, and no physical evidence of tampering at the site wells was evident. No other observations were noted during the four monitoring events in calendar year 1995.

LEGEND

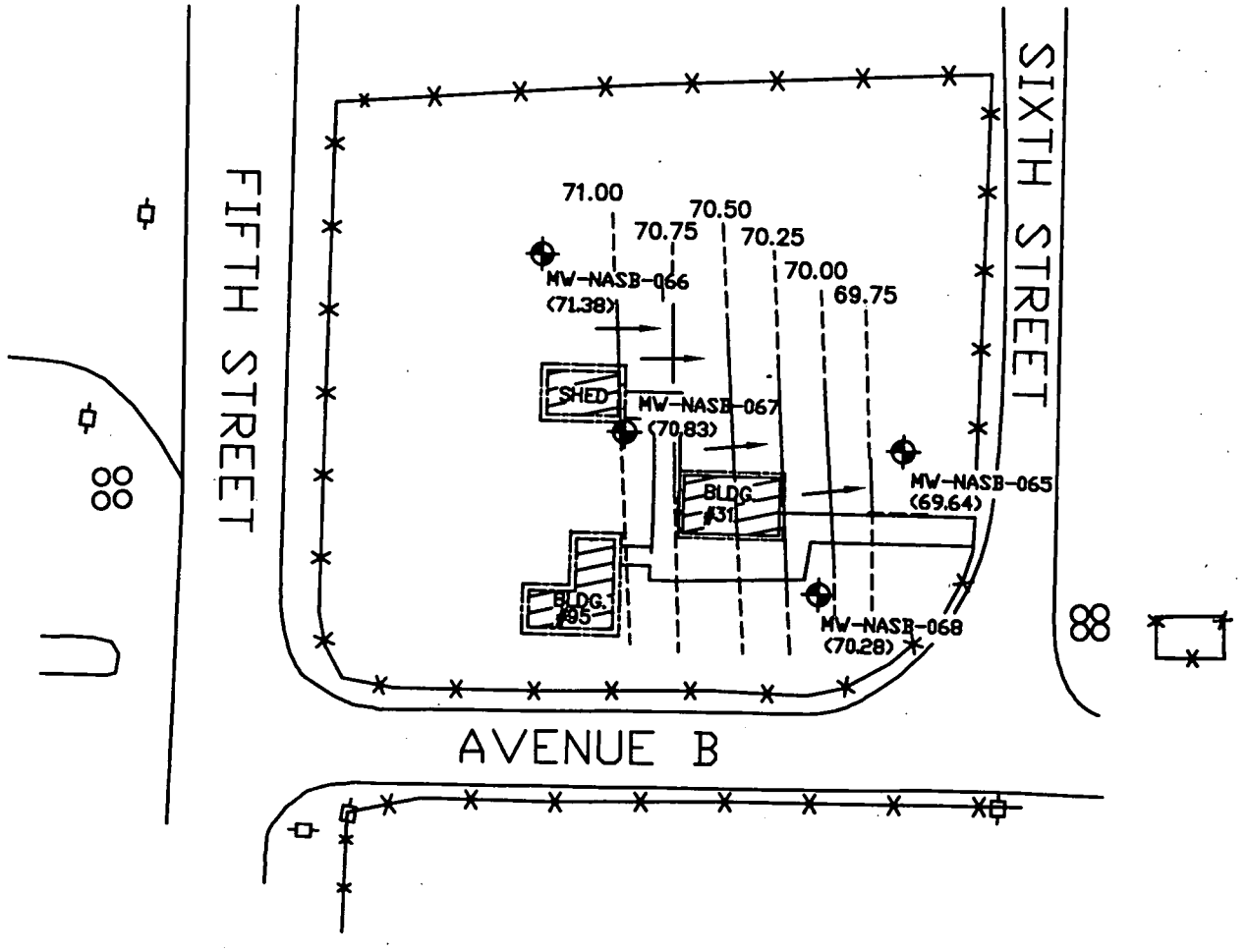
MW-NASB-065 (69.64) — MONITORING WELL (WATER TABLE ELEVATION, FT. MSL.)

INTERPRETED DIRECTION OF GROUND-WATER FLOW

69.50 ---------- INTERPRETED POTENTIOMETRIC SURFACE; DASHED WHERE INFERRED (CONTOUR INTERVAL = 0.25 FT)

FORMER BUILDINGS

CHAIN LINK FENCE



ELECTRIC TRANSFORMER

WELL DESIGNATION	WELL RISER ELEVATION (FT. MSL.)
MW-NASB-065	74.33
MW-NASB-066	78.81
MW-NASB-067	74.38
MW-NASB-068	74.79

45' 0 45'

APPROXIMATE SCALE

DWG. FILE No. F:\CAD\29600\47\BLD95EV1

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BUILDING 95
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 3-1
INTERPRETED WATER TABLE ELEVATIONS, 31 MARCH 1995
WELL GAUGING DATA

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB		SY	PLN	AS SHOWN	22 MAR 1996	29600.47	BLD95EV1

LEGEND

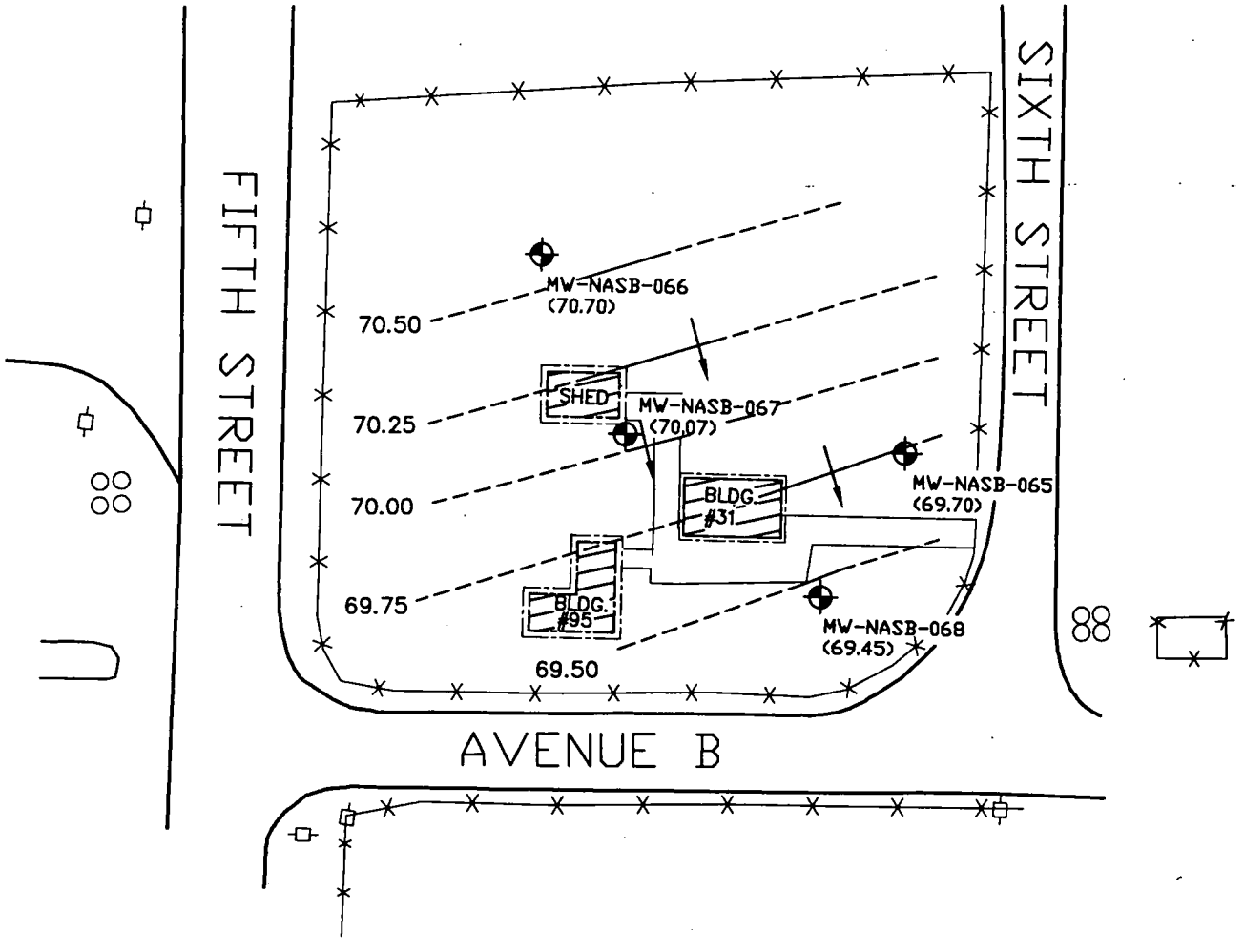
MW-NASB-065 (69.70) — MONITORING WELL (WATER TABLE ELEVATION, FT. MSL.)

INTERPRETED DIRECTION OF GROUND-WATER FLOW

69.50 ------ INTERPRETED POTENTIOMETRIC SURFACE; DASHED WHERE INFERRED (CONTOUR INTERVAL = 0.25 FT)

FORMER BUILDINGS

CHAIN LINK FENCE



ELECTRIC TRANSFORMER

45' 0 45'

APPROXIMATE SCALE

WELL DESIGNATION	WELL RISER ELEVATION (FT. MSL.)
MW-NASB-065	74.33
MW-NASB-066	78.81
MW-NASB-067	74.38
MW-NASB-068	74.79

DWG. FILE No. F:\CAD\29600\47\BLD95EV2

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

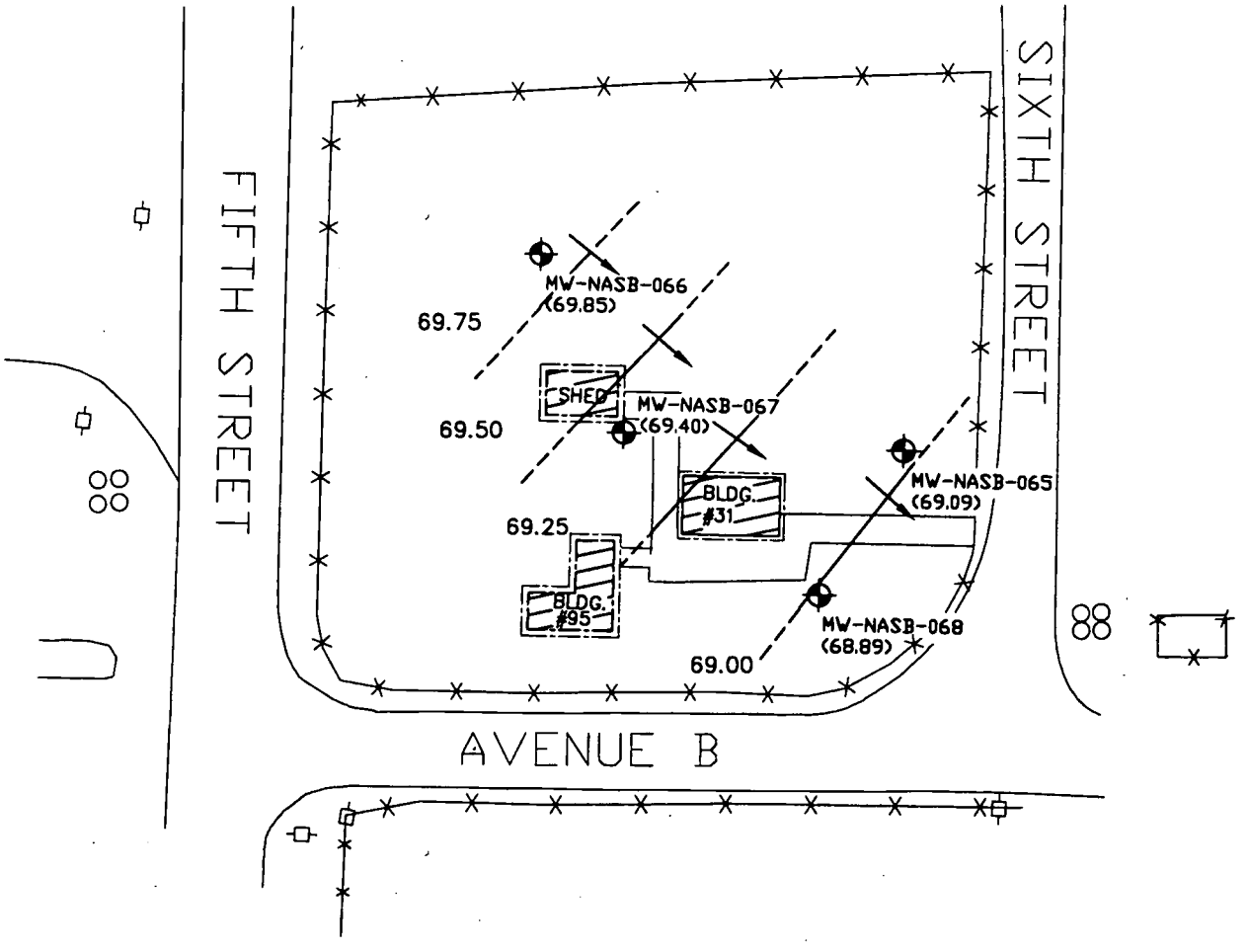
BUILDING 95
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 3-2
INTERPRETED WATER TABLE ELEVATIONS, 1 MAY 1995
WELL GAUGING DATA

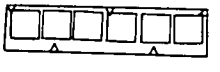
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB		SY	PLN	AS SHOWN	22 MAR 1996	29600.47	BLD95EV2

LEGEND

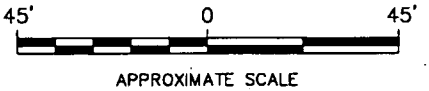
- MW-NASB-065 (69.09) — MONITORING WELL (WATER TABLE ELEVATION, FT. MSL.)
- INTERPRETED DIRECTION OF GROUND-WATER FLOW
- 69.00 ---------- INTERPRETED POTENTIOMETRIC SURFACE; DASHED WHERE INFERRED (CONTOUR INTERVAL = 0.25 FT)
- FORMER BUILDINGS
- CHAIN LINK FENCE



ELECTRIC TRANSFORMER



WELL DESIGNATION	WELL RISER ELEVATION (FT. MSL.)
MW-NASB-065	74.33
MW-NASB-066	78.81
MW-NASB-067	74.38
MW-NASB-068	74.79



APPROXIMATE SCALE

DWG. FILE No. F:\CAD\29600\47\BLDEV3

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

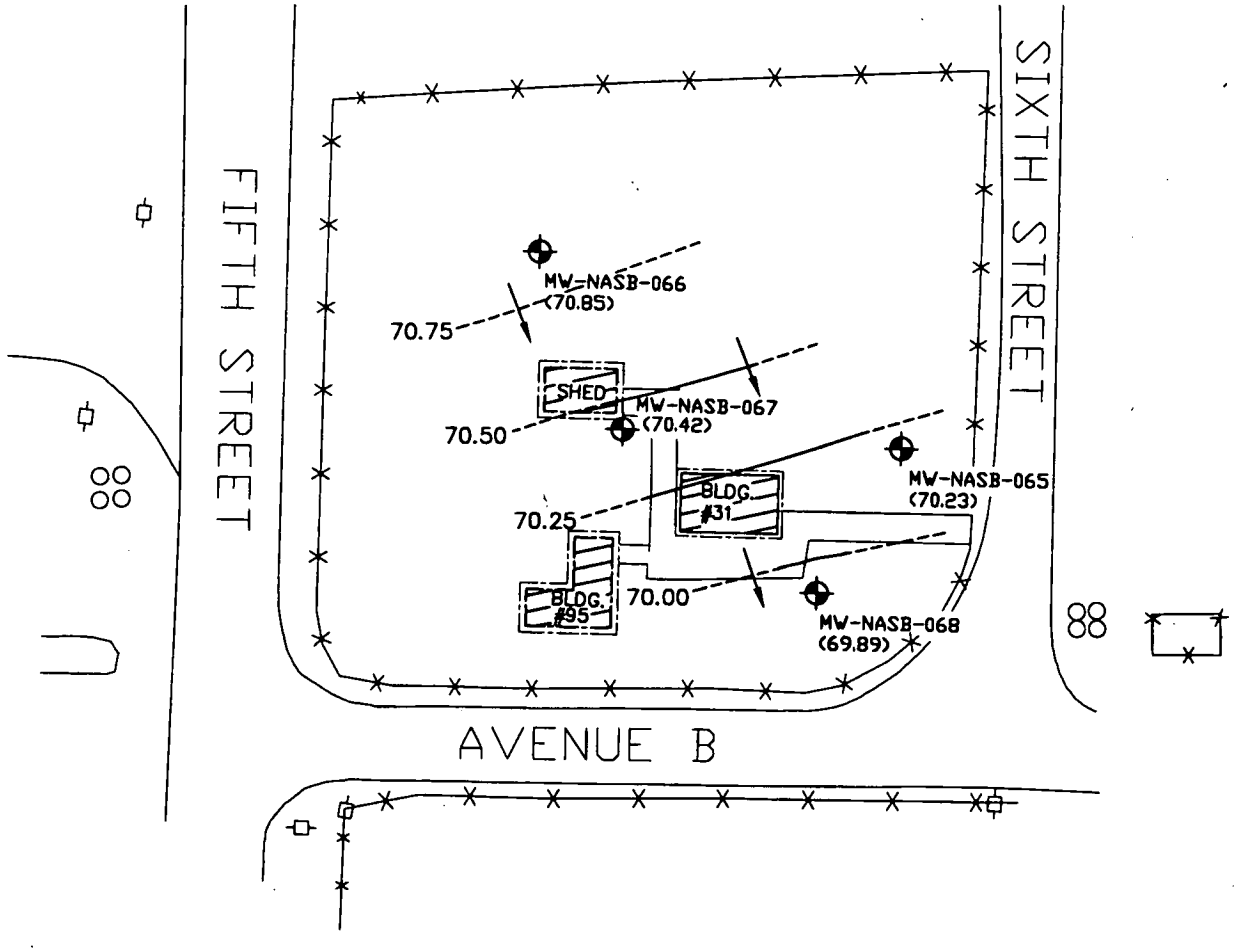
BUILDING 95
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 3-3
INTERPRETED WATER TABLE ELEVATIONS, 2 AUGUST 1995 WELL GAUGING DATA

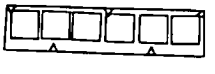
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB		SY	PLN	AS SHOWN	22 MAR 1996	29600.47	BLD95EV3

LEGEND

- MW-NASB-065 (69.09) — MONITORING WELL (WATER TABLE ELEVATION, FT. MSL.)
- INTERPRETED DIRECTION OF GROUND-WATER FLOW
- 69.00 ---— INTERPRETED POTENTIOMETRIC SURFACE; DASHED WHERE INFERRED (CONTOUR INTERVAL = 0.25 FT)
- FORMER BUILDINGS
- CHAIN LINK FENCE



ELECTRIC TRANSFORMER



45' 0 45'

APPROXIMATE SCALE

WELL DESIGNATION	WELL RISER ELEVATION (FT. MSL.)
MW-NASB-065	74.33
MW-NASB-066	78.81
MW-NASB-067	74.38
MW-NASB-068	74.79

DWG. FILE No. F:\CAD\29600\47\BLD95EV4

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

BUILDING 95
NAVAL AIR STATION
BRUNSWICK, MAINE

FIGURE 3-4
INTERPRETED WATER TABLE ELEVATIONS, 14 NOV 1995
WELL GAUGING DATA

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FILE No.
MSB		SY	PLN	AS SHOWN	22 MAR 1996	29600.47	BLD95EV4

TABLE 3-1 MONITORING WELL GAUGING SUMMARY BUILDING 95, NAVAL AIR STATION, BRUNSWICK, MAINE

Gauging Date	Well Riser Elevation (ft MSL)	Depth to Well Bottom (ft below top of PVC well riser)	Depth to Water (ft below top of PVC well riser)	Water Table Elevation (ft MSL)
MW-NASB-065				
31 MAR 1995	74.33	15.50	4.69	69.64
01 MAY 1995	74.33	15.50	4.63	69.70
02 AUG 1995	74.33	15.50	5.24	69.09
14 NOV 1995	74.33	15.50	4.10	70.23
MW-NASB-066				
31 MAR 1995	78.81	19.79	7.43	71.38
01 MAY 1995	78.81	19.79	8.11	70.70
02 AUG 1995	78.81	19.79	8.96	69.85
14 NOV 1995	78.81	19.79	7.96	70.85
MW-NASB-067				
31 MAR 1995	74.38	15.00	3.55	70.83
01 MAY 1995	74.38	15.00	4.31	70.07
02 AUG 1995	74.38	15.00	4.98	69.40
14 NOV 1995	74.38	15.00	3.96	70.42
MW-NASB-068				
31 MAR 1995	74.79	15.05	4.51	70.28
01 MAY 1995	74.79	15.05	5.34	69.45
02 AUG 1995	74.79	15.05	5.90	68.89
14 NOV 1995	74.79	15.05	4.94	69.85

NOTE: MSL = Mean sea level.
PVC = Polyvinyl chloride.
March sampling event data (31 March 1995) used due to anomalous measurements recorded during the 15 March 1995 well gauging event.

TABLE 3-2 SUMMARY OF ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES COLLECTED DURING MONITORING EVENTS 1 THROUGH 4, BUILDING 95

Analyte	PQL[a]	Event 1	Event 2	Event 3	Event 4[b]	MEG[c]	MCL[d]
MW-NASB-065							
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (µg/L)							
Methylene chloride	3.0	1JB	3JB	5B	1JB	---	5
Acetone	5.0	22	11	6B	(<5.0U)	---	---
Total xylenes	2.0	(<2.0U)	1J	1J	11	600	10,000
Toluene	2.0	8	32	10	(<2.0U)	1,400	1,000
Ethylbenzene	2.0	(<2.0U)	(<2.0U)	(<2.0U)	3B	700	700
2-Butanone	5.0	55	(<5.0U)	23	(<5.0U)	170	---
1,1,1-Trichloroethane	2.0	(<2.0U)	(<2.0U)	1J	(<2.0U)	200	200
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (µg/L)							
Phenol	10.0	10	16	(<10U)	(<10U)	---	---
4-Methylphenol	10.0.	29	26	4J	(<10U)	---	---
bis(2-ethylhexyl)phthalate	10.0	3J	(<10U)	2J	(<10U)	---	---
PESTICIDES BY EPA METHOD 8080 (µg/L)							
Heptachlor epoxide	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.04	0.2
Gamma chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
Alpha chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
4,4'-DDE	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	---	---
Endrin	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	2	2[g]
4,4'-DDT	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	0.83	---
4,4'-DDD	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	---	---
TOTAL PYRETHRINS AND ROTENONE BY EPA METHOD 8310 (MODIFIED) (µg/L)							
Total pyrethrins	1.0	(<1.0U)	(<1.0U)	(<1.0U)	(<1.0U)	---	---
Rotenone	0.5	(<1.0U)	(<0.5U)	(<0.5U)	(<0.5U)	4	---
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (µg/L)							
Aluminum	100.0	259	343	408	271	1,430	50-200[h]
Arsenic	8.0	4.2B*	4.5B*	(<2.8U)	(<2.8U)	---	50
Barium	5.0	24.0B*	29.9B*	26.8B*	20.0B*	1,500	2,000
Beryllium	5.0	(<0.20U)	(<0.30U)	(<0.12U)	0.17B*	---	4

NOTE: See Standard Notes Table at end of table section.

Analyte	PQL[a]	Event 1	Event 2	Event 3	Event 4[b]	MEG[c]	MCL[d]
MW-NASB-065 (Continued)							
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (µg/L) (Continued)							
Calcium	50.0	16,700	19,600	14,800	14,000	---	---
Chromium	15.0	2.0B*	4.3B*	6.8B*	1.5B*	100	100
Cobalt	30.0	5.5B*	8.9B*	2.9B*	2.9B*	---	---
Copper	25.0	(<5.6U)	(<2.9U)	2.2B*	2.6B*	---	1,300[f]
Iron	25.0	5,900	12,300	916	361	---	300[h]
Lead	5.0	(<1.3U)	(<0.72U)	(<1.6U)	2.3B*	---	15[f]
Magnesium	50.0	1,870B*	2,020B*	1,780B*	2,220B*	---	---
Manganese	5.0	**256**	**574**	53.8	118	200	50[h]
Nickel	40.0	(<5.5U)	11.3B*	5.6B*	4.1B*	100	100
Potassium	1,000.0	2,280B*	4,770B*	1,640B*	5,040	---	---
Sodium	100.0	28,500	34,500	22,100	21,700	---	---
Vanadium	25.0	4.5B*	6.9B*	4.5B*	3.6B*	---	---
Zinc	25.0	21.4	14.8B*	26.2	24.4	---	5,000[h]
Cyanide	20.0	(<1.4U)	11.3	(<2.6U)	(<1.3U)	154	200
Selenium	10.0	(<1.3U)	1.2B*	(<3.7U)	(<3.7U)	10	50

Analyte	PQL[a]	Event 1	Event 2	Event 2 Dup	Event 3	Event 4	MEG[c]	MCL[d]
MW-NASB-066								
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (µg/L)								
Methylene chloride	3.0	1JB	**12B**	**10B**	5B	4B	---	5
Acetone	5.0	36	(<5U)	(<5U)	3JB	(<5U)	---	---
Total xylenes	2.0	(<2U)	(<2U)	(<2U)	(<2U)	1J	600	10,000
Total 1,2-Dichloroethene	2.0	3	(<2U)	(<2U)	(<2U)	(<2U)	70	70
Trichloroethene	2.0	3	(<2U)	(<2U)	(<2U)	(<2U)	5	5
Toluene	2.0	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	1,400	1,000
Carbon disulfide	5.0	(<5U)	(<5U)	3J	(<5U)	(<5U)	---	---
Ethylbenzene	2.0	(<2U)	(<2U)	(<2U)	(<2U)	1J	700	700
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (µg/L)								
bis(2-ethylhexyl)phthalate	10.0	2J	(<10U)	(<10U)	(<10U)	(<10U)	---	---
PESTICIDES BY EPA METHOD 8080 (µg/L)								
Heptachlor expoxide	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.04	0.2
Gamma chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
Alpha chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
4,4'-DDE	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	---	---
Endrin	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	2	2[g]
4,4'-DDT	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	0.83	---
4,4'-DDD	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	---	---
TOTAL PYRETHRINS AND ROTENONE BY EPA METHOD 8310 (MODIFIED) (µg/L)								
Total pyrethrins	1.0	(<1.0U)	(<1.0U)	(<1.0U)	(<1.0U)	(<1.0U)	---	---
Rotenone	0.5	(<1.0U)	(<0.5U)	(<0.5U)	(<0.5U)	(<0.5U)	4	---
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (µg/L)								
Aluminum	100.0	689	900	694	255	400	1,430	50-200[h]
Barium	5.0	122B*	113	97.6	83.6B*	45.6B*	1,500	2,000
Beryllium	5.0	(<0.20U)	(<0.30U)	(<0.30U)	(<0.12U)	0.15B*	---	4
Calcium	50.0	11,900	9,600	8,800	4,700B*	6,060	---	---
Chromium	15.0	2.9B*	(<2.4U)	2.5B*	2.1B*	1.9B*	100	100
Cobalt	30.0	5.8B*	4.2B*	5.2B*	4.0B*	2.0B*	---	---
Copper	25.0	(<5.6U)	3.2B*	5.1B*	2.6B*	2.2B*	---	1,300[i]
Iron	25.0	1,650	1,510	1,220	2,080	1,970	---	300[h]
Magnesium	50.0	1,400B*	1,150B*	1,020B*	1,430B*	926B*	---	---
Manganese	5.0	132	54.7	50.9	**1,160**	61.5	200	50[i]
Mercury	0.2	(<0.10U)	(<0.10U)	0.10B*	(<0.10U)	(<0.10U)	2	2
Nickel	40.0	8.4B*	11.3B*	11.5	3.1B*	3.4B*	100	100
Potassium	1,000.0	3,720B*	3,110B*	3,260B*	1,750B*	2,110B*	---	---
Selenium	10.0	(<1.3U)	1.4B*	1.2B*	(<3.7U)	(<3.7U)	10	50
Silver	15.0	(<1.9U)	(<2.0U)	2.0B*	(<0.67U)	1.1B*	50	100[h]
Sodium	100.0	92,200	85,900	76,700	47,300	55,900	---	---
Vanadium	25.0	3.7B*	3.0B*	3.0B*	1.3B*	2.1B*	---	---
Zinc	25.0	327	282	221	77.1	98.3	---	5,000[h]

Analyte	PQL[a]	Event 1	Event 2	Event 3	Event 3 Dup	Event 4[b]	MEG[c]	MCL[d]
MW-NASB-067								
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (µg/L)								
Methylene chloride	3.0	1JB	**10B**	4B	4B	5B	---	5
Acetone	5.0	8	<5U)	1JB	2JB	(<5U)	---	---
Total xylenes	2.0	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	600	10,000
1,1-Dichloroethene	1.0	(<1U)	(<1U)	(<1U)	1J	(<1U)	7	7
Total 1,2-Dichloroethene	2.0	1J	(<2U)	(<2U)	1J	(<2U)	70	70
1,1,1-Trichloroethene	2.0	(<2U)	(<2U)	(<2U)	6	(<2U)	200	200
Trichlororethane	2.5	(<2.5U)	(<2.5U)	(<2.5U)	3	(<2.5U)	5	5
Bromomethane	5.0	(<5U)	(<5U)	1J	(<5U)	(<5U)	10	---
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (µg/L)								
Diethyl phthalate	10.0	(<10U)	(<10U)	(<10U)	(<10U)	1J	5,000	---
Di-n-butyl phthalate	10.0	(<10U)	(<10U)	(<10U)	(<10U)	6J	220	---
bis(2-ethylhexyl)phthalate	10.0	1J	(<10U)	1J	6J	2JB	---	---
PESTICIDES BY EPA METHOD 8080 (µg/L)								
Heptachlor expoxide	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.04	0.2
Gamma chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
Alpha chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
4,4'-DDE	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	---	---
Endrin	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	2	2[g]
4,4'-DDT	0.1	(<0.1U)	0.099J	0.24	0.23	(<0.1U)	0.83	---
4,4'-DDD	0.1	(<0.17)	0.044J	0.075J	0.089J	(<0.1U)	---	---
TOTAL PYRETHRINS AND ROTENONE BY EPA METHOD 8310 (MODIFIED) (µg/L)								
Total pyrethrins	1.0	(<1.0U)	(<1.0U)	(<1.0U)	(<1.0U)	(<1.0U)	---	---
Rotenone	0.5	(<1.0U)	(<0.5U)	(<0.5U)	(<0.5U)	(<0.5U)	4	---
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (µg/L)								
Aluminum	100.0	371	382	1,140	1,370	853	1,430	50-200[g]
Arsenic	8.0	1.8B*	2.2B*	(<2.8U)	(<2.8U)	(<2.8U)	---	50
Barium	5.0	51.7B*	50.0B*	66.9B*	66.9B*	29.4B*	1,500	2,000
Beryllium	5.0	(<0.20U)	(<0.30U)	(<0.12U)	(<0.12U)	0.13B*	---	4
Calcium	50.0	22,500	19,100	15,500	15,100	7,240	---	---
Chromium	15.0	(<2.0U)	(<2.4U)	27.6	14.1	3.0B*	100	100
Cobalt	30.0	(<2.4U)	(<2.1U)	6.1B*	1.5B*	1.0B*	---	---
Copper	25.0	(<5.6U)	(<2.9U)	3.9B*	3.2B*	2.6B*	---	1,300[i]
Iron	25.0	3,340	2,230	4,820	4,850	2,450	---	300[h]
Lead	5.0	1.4B*	(<0.72U)	(<1.6U)	(<1.6U)	(<1.6U)	---	15[i]
Magnesium	50.0	1,810B*	1,390B*	1,650B*	1,670B*	652B*	---	---
Manganese	5.0	117	73.8	143	137	58.3	200	50[h]
Nickel	40.0	(<5.5U)	(<7.2U)	18.7B*	9.6B*	1.8B*	100	100
Potassium	1,000.0	2,300B*	2,430B*	2,990B*	3,110B*	1,480B*	---	---
Selenium	10.0	(<1.3U)	1.1B*	(<3.7U)	(<3.7U)	(<3.7U)	10	50
Silver	15.0	(<1.9U)	(<2.0U)	(<0.67U)	(<0.67U)	1.1B*	50	100[h]
Sodium	100.0	36,900	40,900	49,700	47,400	39,700	---	---
Vanadium	25.0	3.3B*	(<2.4U)	7.6B*	7.8B*	8.0B*	---	---
Zinc	25.0	19.8B*	7.9B*	(<19.0U)	(<19.0U)	7.6B*	---	5,000[h]

Analyte	PQL[a]	Event 1	Event 1 Dup	Event 2	Event 3	Event 4[b]	Event 4 Dup	MEG[c]	MCL[d]
MW-NASB-068									
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (µg/L)									
Methylene chloride	3.0	2JB	1JB	**10B**	4B	4B	4B	---	5
Acetone	5.0	(<5U)	(<5U)	(<5U)	2JB	(<5U)	(<5U)	---	---
Total xylenes	2.0	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	1J	600	10,000
Total 1,2-Dichloroethene	2.0	(<2U)	(<2U)	(<2U)	1J	(<2U)	(<2U)	70	100
Ethylbenzene	2.0	(<2U)	(<2U)	(<2U)	(<2U)	(<2U)	1J	700	700
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (µg/L)									
bis(2-ethylhexyl)phthalate	10.0	2J	(<10U)	4J	1J	1JB	(<10U)	---	---
PESTICIDES BY EPA METHOD 8080 (µg/L)									
Heptachlor expoxide	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.04	0.2
Gamma chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
Alpha chlordane	0.05	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	(<0.05U)	0.3[e]	2[f]
4,4'-DDE	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	---	---
Endrin	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	2	2[g]
4,4'-DDT	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	0.83	---
4,4'-DDD	0.1	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	(<0.1U)	---	---
TOTAL PYRETHRINS AND ROTENONE BY EPA METHOD 8310 (MODIFIED) (µg/L)									
Total pyrethrins	1.0	9.4	9.7	(<1.0U)	(<1.0U)	(<1.0U)	(<1.0U)	---	---
Rotenone	0.5	**4.9**	**7.3**	(<0.5U)	(<0.5U)	(<0.5U)	(<0.5U)	4	---
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 ERIES METHODS (µg/L)									
Aluminum	100.0	110B*	173B*	99.3B*	261	209	122B*	1,430	50-200[h]
Arsenic	8.0	(<1.6U)	1.8B*	1.7B*	(<2.8U)	(<2.8U)	(<2.8U)	---	50
Barium	5.0	23.3B*	21.2B*	22.2B*	38.2B*	23.2B*	24.8B*	1,500	2,000
Beryllium	5.0	(<0.20U)	(<0.20U)	(<0.30U)	(<0.12U)	0.16B*	0.16B*	---	4
Cadmium	10.0	(<1.4U)	(<1.4U)	1.2B*	(<3.0U)	(<0.24U)	(<0.24U)	5	5
Calcium	50.0	14,700	14,200	12,800	9,100	7,350	8,480	---	---
Chromium	15.0	(<2.0U)	(<2.0U)	(<2.4U)	22.5	2.8B*	1.6B*	100	100
Cobalt	30.0	5.7B*	6.3B*	12.0B*	14.0B*	2.5B*	2.8B*	---	---
Copper	25.0	(<5.6U)	(<5.6U)	(<2.9U)	2.2B*	2.1B*	2.1B*	---	1,300[i]
Iron	25.0	2,140	2,650	2,260	3,860	370	114	---	300[h]
Lead	5.0	(<1.3U)	(<1.3U)	(<0.72U)	1.7B*	(<1.6U)	(<1.6U)	---	15[i]
Magnesium	50.0	2,080B*	2,110B*	2,790B*	1,420B*	1,550B*	1,760B*	---	---
Manganese	5.0	**837**	**1,010**	**1,920**	**433**	**233**	**242**	200	50[h]
Nickel	40.0	(<5.5U)	(<5.5U)	(<7.2U)	25.2B*	3.0B*	2.4B*	100	100
Potassium	1,000.0	2,930B*	3,220	1,860B*	1,720B*	2,520B*	2,940B*	---	---
Selenium	10.0	(<1.3U)	(<1.3U)	1.3B*	(<3.7U)	(<3.7U)	(<3.7U)	10	50
Silver	15.0	(<1.9U)	(<1.9U)	(<2.0U)	(<0.67U)	(<0.67U)	0.69B*	50	100[h]
Sodium	100.0	18,400	14,200	13,200	27,300	17,900	18,300	---	---
Vanadium	25.0	2.5B*	3.4B*	(<2.4U)	4.0B*	2.6B*	3.0B*	---	---
Zinc	25.0	24.0	20.7	7.0B*	19.7B*	7.2B*	5.1B*	---	5,000[h]
Cyanide	20.0	(<1.4U)	(<1.4U)	(<2.6U)	(<2.6U)	(<1.3U)	1.5B*	154	200

TABLE 3-3 FREQUENCY OF DETECTIONS FOR GROUND-WATER SAMPLES COLLECTED DURING MONITORING EVENTS 1 THROUGH 4, BUILDING 95

Analyte	Event 1	Event 1 Dup	Event 2	Event 2 Dup	Event 3	Event 3 Dup	Event 4	Event 4 Dup	Total	Frequency of Detection (%)
VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8260 (μg/L)										
1,1,1-Trichloroethane	0/4	0/1	0/4	0/1	1/4	1/1	0/4	0/1	2/20	10
1,1,2,2-Tetrachloroethane	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
1,1-Dichloroethene	0/4	0/1	0/4	0/1	0/4	1/1	0/4	0/1	1/20	5
2-Butanone	1/4	0/1	0/4	0/1	1/4	0/1	0/4	0/1	2/20	10
Acetone	3/4	0/1	1/4	0/1	4/4	1/1	0/4	0/1	9/20	45
Bromethane	0/4	0/1	0/4	0/1	1/4	0/1	0/4	0/1	1/20	5
Carbon disulfide	0/4	0/1	0/4	1/1	0/4	0/1	0/4	0/1	1/20	5
Chlorobenzene	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
Ethylbenzene	0/4	0/1	0/4	0/1	0/4	0/1	2/4	1/1	3/20	15
Methylene chloride	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Tetrachloroethene	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
Toluene	1/4	0/1	1/4	0/1	1/4	0/1	0/4	0/1	3/20	15
Total 1,2-Dichloroethene	2/4	0/1	0/4	0/1	1/4	1/1	0/4	0/1	4/20	20
Total xylenes	0/4	0/1	1/4	0/1	1/4	0/1	2/4	1/1	5/20	25
Trichloroethene	1/4	0/1	0/4	0/1	0/4	1/1	0/4	0/1	2/20	10

NOTE: Numerator indicates number of samples which detected parameter.
Denominator indicates total number of samples analyzed for parameter.
Dup = Duplicate sample.
Frequency of detection calculated as follows:

$$\left(\frac{Number\ of\ detections}{Number\ of\ analysis}\right) x\ 100$$

Analyte	Event 1	Event 1 Dup	Event 2	Event 2 Dup	Event 3	Event 3 Dup	Event 4	Event 4 Dup	Total	Frequency of Detection (%)
SEMIVOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8270 (μg/L)										
4-Methylphenol	1/4	0/1	1/4	0/1	1/4	0/1	0/4	0/1	3/20	15
bis(2-ethylhexyl)phthalate	4/4	0/1	1/4	0/1	3/4	1/1	2/4	0/1	11/20	55
Diethyl Phthalate	0/4	0/1	0/4	0/1	0/4	0/1	1/4	0/1	1/20	5
Di-n-butyl phthalate	0/4	0/1	0/4	0/1	0/4	0/1	1/4	0/1	1/20	5
Phenol	1/4	0/1	1/4	0/1	0/4	0/1	0/4	0/1	2/20	10
PESTICIDES BY EPA METHOD 8080 (μg/L)										
4,4'-DDD	0/4	0/1	1/4	0/1	1/4	1/1	0/4	0/1	3/20	15
4,4'-DDE	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
4,4'-DDT	1/4	0/1	1/4	0/1	1/4	1/1	0/4	0/1	4/20	20
Heptachlor expoxide	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
Gamma chlordane	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
Alpha chlordane	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
Endrin	0/4	0/1	0/4	0/1	0/4	0/1	0/4	0/1	0/20	0
TOTAL PYRETHRINS AND ROTENONE BY EPA METHOD 8310 (MODIFIED) (μg/L)										
Total pyrethrins	1/4	1/1	0/4	0/1	0/4	0/1	0/4	0/1	2/20	10
Rotenone	1/4	1/1	0/4	0/1	0/4	0/1	0/4	0/1	2/20	10
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (μg/L)										
Aluminum	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Arsenic	2/4	1/1	3/4	0/1	0/4	0/1	0/4	0/1	6/20	30
Barium	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Beryllium	0/4	0/1	0/4	0/1	0/4	0/1	4/4	1/1	5/20	25
Cadmium	0/4	0/1	1/4	0/1	0/4	0/1	0/4	0/1	1/20	5
Calcium	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100

Analyte	Event 1	Event 1 Dup	Event 2	Event 2 Dup	Event 3	Event 3 Dup	Event 4	Event 4 Dup	Total	Frequency of Detection (%)
TARGET ANALYTE LIST ELEMENTS BY SW-846 6000/7000/9000 SERIES METHODS (μg/L) (Continued)										
Chromium	2/4	0/1	1/4	1/1	4/4	1/1	4/4	1/1	14/20	70
Cobalt	3/4	1/1	3/4	1/1	4/4	1/1	4/4	1/1	18/20	90
Copper	0/4	0/1	1/4	1/1	4/4	1/1	4/4	1/1	12/20	60
Iron	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Lead	1/4	0/1	0/4	0/1	1/4	0/1	1/4	0/1	3/20	15
Magnesium	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Manganese	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Nickel	1/4	0/1	2/4	1/1	4/4	1/1	4/4	1/1	14/20	70
Potassium	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Selenium	0/4	0/1	4/4	1/1	0/4	0/1	0/4	0/1	5/20	25
Silver	0/4	0/1	0/4	1/1	0/4	0/1	2/4	1/1	4/20	20
Sodium	4/4	1/1	4/4	1/1	4/4	1/1	4/4	1/1	20/20	100
Vanadium	4/4	1/1	2/4	1/1	4/4	1/1	4/4	1/1	18/20	90
Zinc	4/4	1/1	4/4	1/1	3/4	0/1	4/4	1/1	18/20	90
Cyanide	0/4	0/1	1/4	0/1	0/4	0/1	0/4	1/1	2/20	10

STANDARD NOTES FOR ANALYTICAL SUMMARY TABLE FOR GROUND-WATER SAMPLES COLLECTED DURING MONITORING EVENTS 1 THROUGH 4 AT BUILDING 95 NAVAL AIR STATION, BRUNSWICK, MAINE

(a) PQL = Practical Quantitation Level.
(b) Reanalysis conducted due to low surrogate recovery.
(c) MEG (Maximum Exposure Guideline) obtained from State of Maine Department of Human Services Revised Maximum Exposure Guidelines, memorandum dated 23 October 1992. Dashes (---) indicate no MEG applicable.
(d) MCL (Maximum Contamination Level) obtained from 40 CFR Parts 141 and 142 (U.S. EPA 1994). Dashes (---) indicate no MCL applicable.
(e) MEG for chlordane; no distinction between alpha or gamma.
(f) MCL for chlordane; no distinction between alpha or gamma.
(g) Proposed MCL as of 23 October 1992.
(h) Secondary MCL, based on taste, odor, or color.
(i) Action level.

NOTE: U = Not detected. Sample quantitation limits are shown as (<____U).
J = Estimated concentration below detection limit.
B = Compound detected in associated method blank.
B* = Analyte concentration is between the instrument detection limit and the CRDL.
Concentrations in bold denote exceedances of MEG and/or MCL (primary levels).

4. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

4.1 SUMMARY OF FINDINGS

4.1.1 Water Level Gauging Program

The ground-water level gauging program conducted during 1995 indicates that the ground-water flow direction is generally toward the east-southeast. Based on the dominant flow patterns observed at the site, well MW-NASB-066 is located hydraulically upgradient of the former building locations, and wells MW-NASB-067 and MW-NASB-068 are located hydraulically downgradient of the former building locations. Well MW-NASB-065 is located hydraulically downgradient to crossgradient of the former building locations.

The average hydraulic gradient in the shallow water table aquifer between wells MW-NASB-066 and MW-NASB-068 is 0.012 ft/ft. In general, the hydraulic gradient was slightly greater during the spring season (i.e., March and May 1995; average hydraulic gradient of 0.015 ft/ft) as compared to the August and November 1995 gauging events (average hydraulic gradient of 0.009 ft/ft). Recorded water table elevations did not exhibit a discernable seasonality trend.

During one monitoring event (15 March 1995), a potential ground-water mound was observed at the site (data reported in EA 1995a). Subsequent monitoring events have not indicated this feature is present at the Building 95 site. This feature may have resulted from precipitation and infiltration and/or may be attributed to the retardation of ground-water movement caused by the placement of the liner system below grade. In either case, this feature is not likely to significantly influence ground-water flow patterns at the site.

4.1.2 Ground-Water Monitoring and Sampling Program

Results of the ground-water sampling and analysis program conducted during 1995 indicate the following:

- VOC were reported in all site wells during 1995, although only methylene chloride was reported at concentrations above regulatory criteria. Methylene chloride was reported at concentrations of 12 μg/L and 10 μg/L in wells MW-NASB-066 and MW-NASB-068, respectively, during the May 1995 sampling event. Methylene chloride was also reported in the trip blanks and method blanks associated with these samples, and the presence of this compound is likely attributable to laboratory contamination. The highest VOC concentrations were reported during the March 1995 and May 1995 sampling events at hydraulically upgradient or crossgradient wells MW-NASB-065 and MW-NASB-066. VOC concentrations in wells located downgradient of the former pesticide/herbicide storage area were generally reported at lower

concentrations than the well located upgradient of the former storage area. VOC concentrations were generally lower during the August and November 1995 sampling events as compared to earlier sampling events.

- There were no SVOC concentrations in ground water reported above the corresponding State MEGs or Federal MCLs. One SVOC [bis(2-ethylhexyl)phthalate] was reported in each of the monitoring wells during at least one sampling event, although this compound is a common laboratory contaminant. The highest SVOC concentrations were reported during the March 1995 and May 1995 sampling events from downgradient/crossgradient well MW-NASB-065. SVOC concentrations were generally lower in site monitoring wells during the August 1995 and November 1995 sampling events as compared to earlier sampling events.

- There were no pesticide concentrations reported above State MEGs or Federal MCLs. Two pesticides (4,4'-DDD and 4,4'-DDT) were reported in ground-water samples from one well, MW-NASB-067, located immediately downgradient of the former shed location. Detectable concentrations of pesticides were reported only from samples collected at this downgradient location during the May and August 1995 sampling events. The State MEG for 4,4'-DDT was not exceeded in any of the ground-water samples; no corresponding State MEG or Federal MCL applies to 4,4'-DDD.

- Total pyrethrins and rotenone were reported only in hydraulically downgradient well NASB-MW-068 during the March 1995 sampling event. Total pyrethrins were reported at a concentration of 9.7 mg/L (no State MEG or Federal MCL). Total pyrethrins were not reported during subsequent sampling events. Rotenone was reported at a concentration of 4.9 μg/L, which nominally exceeded the State MEG of 4 μg/L for this compound. Subsequent sampling events confirmed non-detections for rotenone.

- One inorganic (manganese) was reported above the corresponding State MEG of 200 μg/L at 3 of 4 wells during 1995 sampling events (MW-NASB-065, MW-NASB-066, and MW-NASB-068). All other inorganics were reported consistently below applicable State MEGs and Federal MCLs. The reported concentrations of manganese are likely attributable to natural site conditions rather than due to past disposal practices, as indicated by the elevated background concentrations reported for this analyte (ABB-ES 1994b). In addition, this analyte had a 100 percent detection frequency noted during the 1995 sampling events. Elevated concentrations of manganese have been reported in other areas of NAS Brunswick, as noted in the Site 9 LTMP (ABB-ES 1995).

4.1.3 Visual Inspection

The visual inspections conducted at the site indicated no evidence of stressed vegetation in the site vicinity, nor any evidence of animal burrowing in the vicinity of the soil/debris removal area. Inspection of the excavated area confirmed no exposures of the geotextile cover at the ground surface. No physical evidence of tampering at the site wells was evident.

4.2 CONCLUSIONS

Based on the results of the four monitoring events of 1995, the following conclusions can be made:

- One VOC (methylene chloride), one inorganic (manganese), and one pesticide (rotenone) were reported present above State or Federal water quality criteria. The presence of methylene chloride is likely attributable to laboratory contamination. Elevated manganese concentrations may be attributable to natural site conditions. Rotenone was only reported during the March 1995 sampling event. There were no pesticides, total pyrethrins, or rotenone reported during the November 1995 sampling event, which may indicate that remedial activities at the site have resulted in a decrease in ground-water concentrations of these compounds; additional ground-water sampling will be required for confirmation.

- Ground-water chemical quality data indicates pesticides, pyrethrins, and rotenone were reported in two wells downgradient of the former locations of the shed and Buildings 31 and 95. These compounds were not reported in upgradient/crossgradient wells. No definitive trend could be identified based on the data collected during 1995 regarding the long-term effectiveness of the soil and debris removal action conducted at the site.

- There is no indication that the integrity of the liner system has been compromised by exposure at the land surface or penetration by vegetation and/or animals.

- There are no visual indications of stressed vegetation or adverse ecological impacts at the site.

4.3 RECOMMENDATIONS

Based on the results of the four monitoring events of 1995, the following are recommended:

- Continue performing long-term monitoring as necessary to provide additional data to identify ground-water trends and to assess the effectiveness of the removal actions at the site.

- Increase the time interval between sampling events from 3 to 4 months. It is believed that tri-annual sampling is justified because ground-water samples are collected with dedicated, low-flow sampling pumps that decrease sample variability. It is recommended that sampling be avoided during the December-February time period due to extreme weather conditions which complicate field sampling activities. Tri-annual sampling is recommended to commence in 1996.

- Cyanide was detected at a low frequency during 1995 and, when detected, was reported at concentrations well below the State MEG or Federal MCL. Should the trend of low frequency, low concentration detections continue during the 1996 sampling events, this analyte should be removed from the Long-Term Monitoring Program.

- Since the intent of the emplacement of the geotextile liner system within the soil excavation area was solely to distinguish between native soil and clean fill brought onsite, the requirement for monitoring the integrity of the liner system is not warranted. Therefore, it is recommended that the requirements for visual inspection of the liner system be removed from the Long-Term Monitoring Program.

- VOC, SVOC, and inorganic analytes were detected at low concentrations during 1995. Should the trend of low concentration detections continue during 1996 monitoring events, these analyses should no longer be performed as part of the Long-Term Monitoring Program.

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